

What is claimed is:

1. A thin film magnetic head having at least two magnetic layers including at least a first magnetic pole and a second magnetic pole being magnetically coupled to each other while part of sides facing a recording medium face each other with a write gap layer in between, and having one or two layers or more of thin film coils for generating magnetic flux; comprising:
- a first magnetic layer including the first magnetic pole;
 - a pole tip for composing the second magnetic pole;
 - a first insulating layer formed extendedly at least from the surfaces of the pole tip and the write gap layer which are opposite of sides facing the recording medium to one of the surface of the first magnetic layer;
 - at least one layer of thin film coil with at least part of its film-thickness direction being formed in a region where the first insulating layer is formed;
 - a second insulating layer formed at least between turns of the thin film coil; and
 - a second magnetic layer formed to cover at least part of the thin film magnetic coil while being connected to at least part of the surface of the pole tip which is opposite of the neighboring surface of the write gap layer.

2. A thin film magnetic head according to claim 1 wherein the first insulating layer is further formed along both sides of the surfaces except an edge surface of the pole tip which is opposite of a side facing the recording medium.

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3. A thin film magnetic head according to claims 1 or 2 wherein the first insulating layer is further formed extendedly from a surface of the pole tip which is opposite of a side facing the recording medium to a surface of the second magnetic layer which is opposite of a side facing the recording medium.

4. A thin film magnetic head according to claim 1 wherein the whole part of film-thickness direction of the thin film coil is formed in a region where the first insulating layer is formed.

5. A thin film magnetic head according to claim 1 wherein a surface of the thin film coil which is opposite of a neighboring surface of the first insulating layer is formed so as to substantially make the same surface as the surface of the pole tip which is opposite of a neighboring surface of the write gap layer.

6. A thin film magnetic head according to claim 1 wherein the first insulating layer is formed with an inorganic insulating material.

7. A thin film magnetic head according to claim 1 wherein a write gap layer is placed in part of region between the first magnetic layer and the first insulating layer.

8. A thin film magnetic head according to claim 1 wherein a concave

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area is formed on at least part of a surface of the first magnetic layer on the pole tip side.

9. A thin film magnetic head according to claim 8 wherein the first insulating layer is formed on a surface of the concave area of the first magnetic layer, which is opposite of a side facing the recording medium.

10. A thin film magnetic head according to claim 1 wherein the second insulating layer is formed to be the same surface substantially as a surface of the pole tip which is opposite of a neighboring surface of the write gap layer.

11. A thin film magnetic head according to claim 1 wherein the second insulating layer is also formed between the first insulating layer and the thin film coil.

12. A thin film magnetic head according to claim 1 wherein at least one layer of thin film coil, which is formed by being covered with an insulating layer other than the first and the second insulating layers, is further formed between the second insulating layer and the second magnetic layer.

13. A thin film magnetic head according to claim 1 wherein the number of turns of the most outer thin film coil formed closest to the second magnetic layer among the thin film coil is less than that of other thin film coil, and a slope of an insulating layer which covers the most outer side thin film coil

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and determines an apex angle is gentle.

14. A thin film magnetic head according to claim 1 wherein the thin film coil covered by the first insulating layer and the second insulating layer, and the thin film coil covered by the other insulating layer are electrically connected in a boundary surface between the second insulating layer and the other insulating layer.

15. A thin film magnetic head according to claim 1 wherein width of a side of the pole tip which is opposite of a side facing the recording medium is formed to be wider than width of a side facing the recording medium.

16. A thin film magnetic head according to claims 1 further including a magnetoresistive element for reading-out.

17. A method of manufacturing a thin film magnetic head having at least two magnetic layers including at least a first magnetic pole and a second magnetic pole being magnetically coupled to each other while part of sides facing a recording medium face each other with a write gap layer in between, and having one or two layers or more of thin film coils for generating magnetic flux; including steps of:

selectively forming a pole tip for composing a second magnetic pole at least on a first magnetic pole of a first magnetic layer with a write gap layer in between, after forming the first magnetic layer including the first

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magnetic pole;

forming a first insulating layer extendedly at least from the surfaces of the pole tip and the write gap layer which are opposite of a side facing the recording medium to one of the surfaces of the first magnetic layer;

forming at least one layer of thin film coil with at least part of its film thickness direction being formed in a region where the first insulating layer is formed;

forming a second insulating layer at least between turns of the thin film coil; and

forming a second magnetic layer which is connected to at least part of the surface of the pole tip which is opposite of a neighboring surface of the write gap layer while being made to cover at least part of the thin film coil.

18. A method of manufacturing a thin film magnetic head according to claim 17 wherein a surface of the thin film coil which is opposite of a neighboring surface of the first insulating layer is flattened so as to be the same surface substantially as a surface of the pole tip which is opposite of a neighboring surface of the write gap layer after the whole surface of the pole tip and the thin film coil is covered by the second insulating layer.

19. A method of manufacturing a thin film magnetic head according to claims 17 or 18 wherein the first insulating layer is formed with an inorganic insulating material.

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20. A method of manufacturing a thin film magnetic head according to claim 17 wherein a concave area is formed on the first magnetic layer by selectively etching the surfaces of the write gap layer and the first magnetic layer with the pole tip being a mask after the write gap layer is formed on the whole surface of the first insulating layer and the pole tip is selectively formed on the write gap layer.

21. A method of manufacturing a thin film magnetic head according to claim 20 wherein part of the write gap layer is made to be remained when the write gap layer is etched with the pole tip being a mask.

22. A method of manufacturing a thin film magnetic head according to claim 18 wherein at least one layer of thin film coil covered by an insulating layer other than the first and the second insulating layer is further formed on the flattened second insulating layer.

23. A method of manufacturing a thin film magnetic head according to claim 18 wherein the number of turns of the most outer thin film coil formed closest to the second magnetic layer among the thin film coil is made to be less than that of other thin film coil, and a slope of an insulating layer which covers the most outer side thin film coil and determines an apex angle is made to be gentle.

24. A method of manufacturing a thin film magnetic head according to

claim 17 wherein the second magnetic layer is formed on the pole tip and the second insulating layer after selectively etching the surface of the pole tip to make it lower than the edge surface of the first insulating layer formed in a side surface of the pole tip.

25. A method of manufacturing a thin film magnetic head according to claim 17 further including a step of forming a magnetoresistive element for reading-out.

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